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TITLE OF THE INVENTION

Adjustable plastic carry strap having laterally projecting foldable handles

CROSS-REFERENCE TO RELATED APPLICATIONS

Not Applicable

BACKGROUND OF THE INVENTION**FIELD OF THE INVENTION**

The invention relates to a strap having male and female end locking portions that can be manually secured so that the strap forms a closed loop, and handle portions that can be manually coupled in-situ to form one or more handles to facilitate manually lifting and carrying an object placed within the loop.

DESCRIPTION OF THE RELATED ART

It is necessary in many environments, to lift large, sometimes cumbersome objects manually, in the absence of machinery to perform such a task (such as a crane or forklift). Additionally, some objects, while heavy or awkward, may be too small to justify the use of a machine (such as a forklift) or are required to be moved in areas inaccessible to a machine, thus typically being left to be handled manually by a worker.

For example, in a farm environment, while many chores can be at least partially automated, much manual labor is still typically required, such as moving objects from vehicles to a storage facility or *vice versa*. Some objects that may typically be used in such an environment,

(such as a bucket), comprise integral handles of varying types to facilitate manual handling of the object. However, many tasks about an agricultural or industrial environment may require handling bulk materials, in a box, sack, or the form of a roll or cylinder just to name a few. Bulk materials in forms such as this can quickly become unwieldy, which makes the task for a worker more difficult and more dangerous. Stooping down to ground level to pick up a sack or roll of material will almost without doubt place a worker in a position in which he or she is at an increased risk for causing a painful injury in his or her back, or other part of his or her body. Any means for improving the difficulty, comfort and safety levels of such a chore is desirable.

A number of devices for either carrying and/ or bundling objects are known. U.S. Patent No. 5,695,234 to Coticchio et al. describes a carrying device for shopping bags consisting of "loop forming element" (10) and two handles (12, 14) having gripping portions (22 and 22') arranged on the longitudinal ends of the strap portion. The two handles mate with each other via projections 18 and sockets 24 (Fig 3) or a handle is inserted into a hole to form a noose around an object (Figures 10 and 11). The handles described by Coticchio are pre-formed, prior to use.

U.S. Patent No. 3,493,154 to Engle describes a flexible package carrying strap having a relatively wide width, but manufactured from one piece of material. There is a single handle on the strap of Engle, pre-formed at a longitudinal end of the strap. Adjustability is provided by multiple slots at one end into which the handle end fits.

U.S. Patent No. 4,558,896 to Farnworth describes a handle for attachment to a load the handle having an open slot (28) for receiving a T-bar (26). The slot (24) is provided to allow the strap portion (12) to curve when in use (Fig. 4). The handle portion of Farnworth is

pre-formed, is arranged at a longitudinal end of the strap, and does not fold.

U.S. Patent No. 4,514,876 to Houlberg describes an injection moulded bag closure having two handle portions (3, 4) attached to bag-carrying bars (1a, 1b). The handles of Houlberg lock together (Fig. 3) by means of hook and shoulder-shaped portions (6, 7), thereby closing the mouth of the bag (which is already attached to the bag-carrying bars (1a,1b)). The widths of the handles of Houlberg are about as wide as the entire opening of the bag.

U.S. Patent No. 5,735,019 to Kerr et al. describe an assist handle to aid a user in carrying bags (such as Coticchio, above), having sling portion (10) across which bag handles lay. Handle cut-outs (17) are formed in longitudinal ends of the sling (10). A grip (40), is used to make using the device more comfortable, and to hold the two ends of the sling (10) together.

U.S. Patent No. 5,715,578 to Knudson describes a bundle tie having a rubber band loop (5) and one bar-shaped handle (3) arranged at one end of the loop (5). The handle of Knudson is a rigid bar, and the Knudson device ties by looping the handle (3) through the loop (5).

U.S. Patent No. 5,005,891 to Lunsford describes a bag handle apparatus with a purpose similar to that of Kerr and Coticchio. Lunsford's device comprises a relatively wide sheet (22) to distribute the weight of a load across a user's hand. Bag handles are placed in a center portion of the sheet and the sheet is wrapped around the bag handles. The entire device acts as a cushion, and does not have any distinct handle.

U.S. Patent No. 5,096,248 to Ryan describes a bundling handle having a strap portion (11) and grip portion (8), among other features. The handle is used in a manner much

like the bundling tie of Knudson (described above), in that the device attached to itself by looping around and through itself (Fig. 4). A user lifts the device by inserting his or her hand into a pre-formed slot (17), which is arranged at a longitudinal end of the bundling handle of Ryan.

U.S. Patent No. 4,696,505 to Shadoan describes a handle and strap apparatus for hand-carrying articles. Shadoan has a strap portion that can be looped around various sizes and shapes of objects. The strap portion of Shadoan is a separate piece from the rigid handle portion, and connects to the rigid handle (10), which is arranged at an end of the strap portion, by looping through openings (34, 36) therein.

U.S. Patent No. 6,062,622 to Susman et al. describe a handle clasp for bags consisting of a strap forming a loop around bag handles to be carried, the strap having a wider, in-line handle region (20), where it is held by a user, the handle region being pre-formed, prior to use.

U.S. Patent No. 1,829,613 to Sato describes a fastener, particularly for fastening stacks of material such as paper. Sato's fastener includes an elongate body with a single male portion and a mating head having a series of transverse slots for receiving the male portion. These multiple slots allow the length of the fastener to adjust to an appropriate size. Sato suggests the use of a malleable metal for his fastener.

U.S. Patent No. 3,913,179 to Rhee simply describes a tie strap without a handle, having a plurality of slots and tabs, incorporating T-slots 44, 46 and 48.

U.S. Patent No. 487,145 to Gibbons describes a halter for a horse that includes a

strap (f), a distal T-head (k) and linear slots (l) to increase or decrease the length of the strap (f).

U.S. Design Patent No. 252,741 to Taylor is a U.S. design patent that shows a tie strap without a handle, apparently having a plurality of linear longitudinal holes and two identical angled ends. It appears as though there would be two possible manners in which to affix the ends to a longitudinal hole, if desired. The smaller, most distal protrusion could act as a temporary fixing means that is more easily removed than the triangular portion, which could act as a barb and lock the sections together.

Many people have a need for a simple and inexpensive way to handle bulky objects such as rolls of material, since even a simple roll of plastic can weigh upward of 100 lbs. Thus, a device to facilitate handling of rolls of material, or other objects, that is small and inexpensive enough to be included with a roll of material or other object, is desired.

BRIEF SUMMARY OF THE INVENTION

The invention relates to an adjustable carry strap and handle for facilitating the lifting of an object, such as a roll of material. Additionally, the invention facilitates the bundling of materials. The carry strap and handle includes an elongated and substantially planar strap, having first and second ends, with one end having one or more longitudinally spaced coupling portions. In some embodiments, each coupling portion extends from opposed lateral sides of the second end of the strap, and the first end terminates in a female portion having an aperture adapted to serially receive locking portions of the second end of the strap portion. In these embodiments, each of the coupling portions, when inserted into the aperture, is capable of

detachably engaging a portion of the female portion near the aperture.

The carry strap and handle also includes a pair of laterally-protruding handle halves. Depending on the embodiment, each handle half extends from opposed lateral sides of the strap, and is substantially symmetrical to the other about a longitudinal axis of the device. Each handle half has a U-shape with two or more connecting portions that are substantially perpendicular to the longitudinal axis of the strap, and one grip portion that is arranged between the two connecting portions. The grip portion is laterally spaced from the lateral edge of the strap. This positioning forms a space large enough for a hand to fit into and grip the handle. The handle halves initially are coplanar with the strap and the two laterally opposed handle halves are adapted to fold together in-situ to an upright position to form the handle for the strap.

Benefits to using the subject carry strap and handle include increased ease, comfort, stability and safety of an object to be carried, on the part of the user. If an object to be carried does not normally include a handle, one can easily be affixed to the object through use of the subject carry strap and handle. Accordingly, objects such as rolls of knitted netting or film having widths larger than a typical arm span of a user, that as a result are typically awkward to handle, become less awkward. Accordingly, a user will find a decreased need to place his or her body in a position likely to cause harm. This is important, especially considering the heft of objects often handled manually. Users handling of rolls of material, cylinders of compressed gas, sacks, crates, boxes, tubes, pipes, bundles, and individual items (a section of a log, for instance) can all benefit from the subject carry strap and handle.

Additional features and embodiments of the invention are discussed in detail

below, with reference to the Figures.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a top view of a first embodiment of the present invention;

Figure 2 is a top view of a second embodiment of the present invention;

Figure 3 is a perspective view of the second embodiment of the present invention;

Figure 4A is an enlarged partial view of an embodiment of the present invention;

Figure 4B is an end view of an embodiment of the present invention;

Figure 5 is a side view of a portion of the handle of one embodiment of the present invention;

Figures 6A-6E illustrate various embodiments for the coupling portions at the second end of the carry strap according to the present invention;

Figures 7A-7C illustrate various embodiments for the coupling portions at the second end of the carry strap according to the present invention;

Figures 8A-8C illustrate various embodiments of the second ends of the strap portion according to the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Figure 1 illustrates a top view of one embodiment of the present invention.

Depending on the implementation, the subject carry strap **100** may be used to lift rolls of material, to bundle and lift objects (such as sticks, for example), to lift boxes, or many other

types of objects.

The adjustable carry strap and handle **100** includes an elongated and substantially planar strap portion **110**. In one embodiment, the second end has one or more longitudinally spaced male coupling regions **120**, with each coupling portion extending from opposed lateral sides **111** of the second end of the strap portion **110**. In this embodiment, the first end terminates in a female portion **150** having an aperture **130** adapted to serially receive the male coupling region(s) **120** at the second end of the strap. Each of the coupling portions **125**, when inserted into the aperture **130**, is capable of detachably engaging a portion of the female portion **150**.

As seen in the embodiments Figures 1 and 4, the aperture **130** at the first end of the strap portion **110** for receiving the second end of the strap portion **110** are T-shaped and includes a perpendicular portion **131** arranged substantially perpendicular to the longitudinal axis of the strap portion **110** and a longitudinal portion **135** arranged substantially parallel to the longitudinal axis of the strap portion **110**. In this embodiment, the perpendicular portion **131** of the T-shaped aperture **130** is shorter than the longitudinal portion of the T-shaped aperture to facilitate insertion of the coupling region **120** having a width greater than that of the perpendicular portion of the T-shaped aperture **130**. In this case, the larger width of the coupling portions **125** further secures the first and second ends of the carry strap and handle **100** to one another. The T-shaped aperture **130** may further comprise tails **133** arranged parallel to the longitudinal portion **135**, but at the ends of the perpendicular portion **131**. These tails **133** facilitate the insertion of the coupling portions **125**, by creating tabs **137** that, while still providing resistance to back-out by partially obscuring the aperture **130**, also provide increased

ease of insertion, as they are only connected to the strap portion **110** along one edge.

When the mating male coupling region **120** and female coupling portion **150** comprise protuberances such as male coupling portions **125**, that have a width wider than the location of the aperture in which the male coupling portions **125** ordinarily reside. Accordingly, when inserted into the aperture **130** of the female portion **150**, the relatively wide male coupling portions **125** prevent uncoupling of the male coupling region **120** and the female portion **150**. For example, in embodiments having substantially T-shaped apertures **130** and a male coupling region **120** having male coupling portions **125**, the steps for attachment are typically as follows. First, the male coupling region **120**, is rotated so as to align with the longitudinal portion **135** of the aperture **130**, and is inserted into the aperture **130**. The male coupling portions **125**, while inserted in the longitudinal portion **135**, is rotated into alignment with the perpendicular portion **131** of the aperture **130**. In this position, and with the strap in a state of tension, a first edge of the male coupling portions **125**, abuts against the face of the female coupling portion **150** in regions to the side of the perpendicular portion **131**. Since the length of the longitudinal portion **135** is typically greater than that of the perpendicular portion **131**, the male coupling region **120** is more easily inserted into this region and is more difficult to remove from the perpendicular portion **131**, once fully inserted. Also, since typically, the perpendicular portion **131** is approximately the same width of the strap portion **110**, and the width at the male coupling portions **125** is larger than that of the perpendicular portion **131**, resistance to pull-out is achieved.

The carry strap and handle **100** may be removed from the object to be carried by

any of a variety of means, including cutting a portion of the carry strap and handle **100** or by disengaging the male and female portions **125, 150** in an order that is the reverse of that to attach the male and female portions **125, 150**.

The male coupling region **120** at the second end of the strap may, in alternate embodiments, comprise other means for attachment to the first end of the strap and/or female portion **150**. In this case the sense of the terms "male" and "female" refers to two regions that are joined together. Such other means for attachment may include a buckle, snaps, hook-and-loop fasteners, staples, adhesive or any other practical means. Alternatively still, attachment of the first and second ends may be achieved with no additional component, for example, by welding, heat-welding, solvent-welding, or crimping the two ends together, depending on the particular embodiment.

In almost any embodiment, the carry strap and handle **100** can be configured to fit about two or more pre-selected circumferences of objects. For example, if a manufacturer sells rolls of material in varying amounts, say 100 yard and 300 yard rolls, then, naturally, the diameters and circumferences will be different. If the subject carry strap and handle **100** is to be used in this situation, then adjustability of the carry strap and handle **100** must be provided. One manner in which this need may be met is to include a series of male coupling portions **125** or protuberances on the second end of the carry strap and handle **100**. Each male coupling portion **125** allows coupling of the male and female coupling portions **125, 150** at that point. Since any one diameter object to be lifted necessitates a particular length of strap portion **110**, if objects will be selected from two objects each having a different diameter, then only two coupling

locations may be necessary. Thus, two or more sets of male coupling portions **125**, each longitudinally spaced with respect to the longitudinal axis of the strap portion **110**, be used to determine the location at which the first and second ends of the carry strap and handle **110** will attach (and the resultant circumference of the strap). The positions of these tabs will typically correspond to the circumference(s) of objects to be lifted.

Furthermore, male coupling portions **125** may be arranged in groups about two or more pre-selected longitudinal positions. That is, instead of just one pair of male coupling portions **125** near each position, multiple pairs of male coupling portions **125** may be arranged at each location. In this embodiment, additional tabs provide a tolerance for varying roll circumference. So, while a full range of male coupling portions **125** may not be needed, a desired level of adjustability is still achieved without unnecessary material expense. It is to be understood that principles of the foregoing example embodiments, in which different arrangements of male coupling portions **125** are discussed, can be applied to alternate means for securing the first and second ends of the carry strap and handle **100** to each other (Such as snaps, hook-and-loop fasteners, etc.).

Alternatively, two or more apertures **130** may be included on an enlarged or on multiple female coupling portions **150**. As such, adjustability is provided. Yet further, the carry strap and handle **100** may be arranged such that it comprises a plurality of male coupling regions **120** and a plurality of female coupling portions **150**. Thus, the particular means by which adjustability is achieved may be selected by the user, and if desired, two or more male and female coupling portions **120**, **150** may be utilized at the same time to provide a redundant

connection for safety reasons and/or to increase the carrying capacity of the device by distributing the stresses at one connection over a plurality of connections.

The carry strap and handle also includes a pair of laterally-protruding handle halves **140**. Each handle half extends from opposed lateral sides **111** of the strap **100**, and is substantially symmetrical to the other about a longitudinal axis of the strap **100**. The handles preferably lay flat prior to use and when not in use for space savings, and to facilitate stacking of the straps **100** themselves and/or objects held by the straps **100**.

Each handle half **140a,b** may have a U-shape with two or more connecting portions **148** that are substantially perpendicular to the longitudinal axis of the strap, and one grip portion **149** that is arranged between the two connecting portions **148**. The grip portion **149** is laterally spaced from the lateral edge **111** of the strap portion **110**. This positioning forms a space **147** large enough for a hand to fit into and grip the handle **140**.

Alternatively, the handle halves **140a,b** may comprise T-shaped handle portions connected to the strap by a single, centrally located connecting portion. With this embodiment, a user's fingers sit to each side of the connecting portion, rather than in-between two connecting portions, as with the above embodiment. Alternatively still, the handle halves **140a,b** may comprise loops to enable a user to grip the carry strap and handle, and the object to be lifted or semi-annular sections consisting of a generally arcuate handle halves attaching at each end to the strap. Such loops and semi-annular sections, U-shape and T-shape handles may be integrally formed with the strap itself or may be made from an additional component that is later attached to the strap portion **110**. Also, the handle halves **140a,b** may be made from a string-like material

such as a rope that is attached to the strap portion **110** via eyelets in the strap portion **110**. Of course, other shapes for the handles **140** are possible, though not specifically described herein.

In each embodiment, the handle halves **140a,b** initially are coplanar with the strap portion **110**, and the two laterally opposed handle halves **140a,b** are adapted to fold together in-situ to an upright position to form the handle for the strap. In the case of U-shaped handle halves, for example, one or more creases **540** (Figure 5) may be formed to facilitate upright folding of the handle halves. Also to facilitate folding, an intermediate connecting portion **543** between the edge **111** of the strap and the handle connecting portion **148**, may have a reduced thickness. Further, the intermediate connecting portion **543** may be shaped such that it prevents folding beyond a pre-selected point, for example, the intermediate connecting portion **543** may have a triangular or trapezoidal profile (Figure 5). Such a configuration results in two “hinges,” one on each side of the connecting portion **543**, which, when in use, cause adjacent surfaces to fold toward and touch each other, causing interference which prevents the handle from folding beyond a pre-determined point.

The handle halves **140a,b** may be located near the first end of the strap portion **110**, near the second end of the strap portion **110**, or at an intermediate location between the first and second ends of the strap portion **110**.

Depending on the embodiment, the handle **140** may comprise a flange portion **460** about one or more edges of the handle to provide increased rigidity and comfort for the user. Such a flange portion **460** typically includes a narrow band of an increased thickness along the edge of the handle. The additional material spaced from the middle of the handle helps resist

bending stresses in and resulting deformation of the handle **140**. The flange portion **460** may be located along an outer contour of the handle **140** and/or along the inner contour **440** of the handle **140**.

When using the carry strap and handle **100**, a user lifts each handle half **140a,b** from a normally flat position. If multiple carry strap and handles **100** are used, a user will typically grip one pair of handle halves **140a,b** in each hand, and lift the object. If the carry strap and handle **100** is embodied such that the spacing between each handle half **140a,b** is relatively large and/or if only one carry strap is used, the user will typically grip one handle half **140a,b** in each hand, and lift the object.

In some embodiments, the grip portion **149** of the handle **140** has an undulating contoured inner edge **440** adapted to comfortably fit against a user's fingers, such that when the carry strap and handle **100** is lifted by the user, the undulations prevent excessive sliding of the device about the user's hands. Also, a gripping surface made from a textured or easily gripped material, such as rubber or the like, may be formed on or attached to the surface of the grip portion **149** to reduce undesired movement of the handle about the user's hands.

Also as seen in Figures 1-4, the device may further include a pair of tabs **450** at the first end of the carry strap and handle **100**. The tabs **450** are adapted to secure an excess portion of the second end of the strap **100** protruding through the aperture **130**, to the surface of the strap **100**. The tabs **450** extend upward from a first planar surface of the strap **100**. The tabs **450** also may have inwardly projecting protrusions **450** located at their upper ends.

Figures 6A-6E illustrate various arrangements for the coupling portions at the

second end of the carry strap **100**. Depending on the specific embodiment, each longitudinally spaced coupling portion at the second end of the strap may include a pair of laterally extending barbs **610** (Fig. 6A) or laterally extending arrow-shaped locking portions **620** (Fig. 6B) on opposite lateral edges of the strap in order to engage with the aperture **130**. Alternatively, bosses **615, 617** (Figs 6C, 6D) may replace barbs **610**. Alternatively still, each coupling portion at the second end of the strap may include a pair of angled notches **630** (Fig. 6E) adapted to lockably engage a portion of the aperture **130**. The angled notches **630** have two legs **631, 632**. A first leg **631** is substantially perpendicular to the longitudinal axis of the strap portion **110**. A second leg **632** is oblique to the longitudinal axis of the strap portion **110** such that a distal end of the second leg **632** is located closer to the longitudinal axis of the strap than a first end of the second leg **632**. The first leg **631** is capable of detachably engaging the aperture **130** at the first end of the strap portion **110** to prevent loosening of the first and second ends of the strap **130**. The second leg **632** allows a one-way ratcheting effect to facilitate tightening of the strap about the object to be lifted.

Figures 7A-7C illustrate alternative means for attachment of the first and second ends of the carry strap and handle **100**, which may include snaps **710a,b**, hook-and-loop fasteners **720a,b**, staples **730** or adhesive. Alternatively still, attachment of the first and second ends may be achieved with no additional component, for example, by welding, heat-welding, solvent-welding, or crimping the two sections together, depending on the particular embodiment.

Figures 8A-8C illustrate various embodiments of the second end of the strap portion **110**. The second end of the strap may terminate (1) in a surface that is oblique **810** to the

longitudinal axis of the strap; (2) in a portion symmetrical relative to the longitudinal axis of the strap, having at least one oblique portion **820**; or (3) a surface that is substantially perpendicular to the longitudinal axis of the strap **830**.

In general, the length of the strap portion **110** may be pre-selected to advantageously approximate a circumference around an object to be lifted. Alternatively, a distance between longitudinally spaced coupling portions **125** may be pre-selected based upon the circumference of the object to be lifted.

The handle halves **140a,b** may be arranged on the strap portion **110** near the first end of the device **100** and may automatically fold flat when not in use, into the plane of the strap. A gusset **145** may be affixed to and arranged between at least one lateral edge of the strap and at least one connecting portion of the handle, in order to strengthen the junction.

Depending on the embodiment, the subject carry strap **100** may be used alone or in combination with other carry straps **100**. The carry straps **100** may be connected end-to-end, or used in parallel on the same object. In the latter situation, two or more carry straps **100** may be spaced apart along the length of an object by a distance approximately that of a user's outstretched arms, to allow the user to comfortably lift the object, with one handle **140** of one carry strap **100** in each hand. Alternatively, the carry strap **100** may be relatively wide, or may have a wide section between the two handle halves **140a,b** of the carry strap **100**. This would provide a comfortable spacing between handle halves **140a,b**. Similar to the former application, this latter application allows a handle half **140a,b** to be gripped, one in each hand.

The entire carry strap and handle **100** may be manufactured from a single piece of

material. Preferably, the material for fabrication is a plastic. Suitable plastics that may be used include Nylon, Polyolefins such as polyethylene (including low-density polyethylene (LDPE), high-density polyethylene (HDPE), ultra-low-density polyethylene (ULDPE), ultra-high molecular-weight polyethylene (UHMWPE), cross-linked polyethylene (PEX), polyethylene terephthalate (PET)) and polypropylene. Other plastics that are believed suitable include polyester, polyamides, polyvinylchloride (PVC), vinyl, and the like. Particularly preferred are polyethylene and polypropylene. Alternatively, materials for fabrication of the carry strap and handle may include rubbers, metals, paper, cardboard, composite materials and animal products, such as leather. Metals used may include aluminum, copper, steel, and alloys of these, and other metals.

Also alternatively, the carry strap and handle **100** may be manufactured from a plurality of components, each being made from a different material. If the carry strap and handle **100** is manufactured from plastic, it may be cast, molded, shaped, for example by shearing and/or punching from flat stock, or formed by any other suitable means. If the carry strap and handle **100** is manufactured from metal, it also may be cast, stamped, or shaped, for example by shearing and/or punching.

While certain embodiments are described herein, it will be readily apparent that minor changes of structure and operation can be made without departing from the spirit of the invention, as defined by the scope of the appended claims. It is further intended that each element recited in the claims is to be understood as referring to all equivalent elements.